

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application.

Listing of Claims:

1. (Original) A method for operating the spacecraft-related portion of an arrangement for transmitting Available Bit Rate service Asynchronous Transfer Mode (ATM) data over a transmission path including a spacecraft, where the spacecraft includes transmission path ATM data routing switches which lack capability for marking Resource Management cells with congestion information, said transmission being in an Available-Bit-Rate operating mode in which data is transmitted over the transmission path in bandwidth which is otherwise unused by services other than Available Bit Rate service Asynchronous Transfer Mode data, said method comprising the steps of:

at a source terminal which transmits said Available Bit Rate service Asynchronous Transfer Mode data to said spacecraft, receiving from a source node Available Bit Rate service Asynchronous Transfer Mode data including Resource Management cells, and deleting the Resource Management cells from the stream of Available Bit Rate Asynchronous Transfer Mode data flowing to the spacecraft, so as to reduce the amount of superfluous data flowing in an ABR bandwidth portion of the spacecraft resources;

determining at least the presence of absence of congestion in the spacecraft payload in paths associated with said Available Bit Rate service Asynchronous Transfer Mode data by means

other than by use of said routing switches, to thereby produce spacecraft-congestion-related signals;

coupling said spacecraft-congestion-related signals by way of at least a downlink to said source terminal; and

at said source terminal, using information derived from said spacecraft-congestion-related signals to mark back Resource Management cells for return to said source.

2. (Original) An arrangement for transmitting Available Bit Rate service Asynchronous Transfer Mode (ATM) data over a transmission path including a spacecraft, said Available-Bit-Rate operating mode being one in which data is transmitted over the transmission path in bandwidth otherwise unused by services other than said Available Bit Rate service Asynchronous Transfer Mode data, said arrangement comprising:

a source of Available Bit Rate service Asynchronous Transfer Mode data which generates Resource Management cells and combines said Resource Management cells with information data to form said Available Bit Rate service Asynchronous Transfer Mode data to be transmitted, and which is responsive to congestion-indicative information contained within returned Resource Management cells for adjusting the transmission rate of at least said Asynchronous Transfer Mode data portion of said Available Bit Rate service Asynchronous Transfer Mode data to tend to maintain in use, for said Asynchronous Transfer Mode data, said bandwidth otherwise unused, while tending to avoid

congestion which might otherwise result in loss of Asynchronous Transfer Mode data cells;

a spacecraft including transmission data path switches which do not mark Resource Management cells with congestion information, and a terrestrial Network Control Center communicating with said spacecraft, said Network Control Center co-acting with said spacecraft to determine the level of congestion in at least one service other than said Available-Bit-Rate service Asynchronous Transfer Mode data, and to tend to control said congestion in said at least one service other than said Available Bit Rate service Asynchronous Transfer Mode data by means of payload congestion control signals transmitted between said spacecraft and said Network Control Center over a signal path including an uplink and a downlink;

a terrestrial spacecraft source terminal coupled to receive Available Bit Rate service Asynchronous Transfer Mode data from said source of Available Bit Rate service Asynchronous Transfer Mode data, and communicating, by means of uplinks and downlinks, with said spacecraft, said spacecraft source terminal being arranged for receiving Resource Management cells associated with said Available Bit Rate service Asynchronous Transfer Mode data, and for marking said Resource Management cells in locations indicative of at least the presence or absence of congestion, and of returning said Resource Management cells, so marked, toward said source of Available Bit Rate service Asynchronous Transfer Mode data, in the form of back Resource Management cells, and also being arranged for transmitting at least said Asynchronous Transfer

Mode data portion of said Available Bit Rate service Asynchronous Transfer Mode data to said spacecraft over an uplink;

means located at said terrestrial spacecraft source terminal for receiving said payload congestion control signals, and for marking said Resource Management cells with payload congestion information derived from said payload congestion control signals originating from said Network Control Center, thereby closing a control loop including said source of Available Bit Rate service Asynchronous Transfer Mode data, said terrestrial spacecraft source terminal, and said spacecraft, whereby congestion of said Available Bit Rate service Asynchronous Transfer Mode data tends to be controlled in that portion of said transmission path including said source of Available Bit Rate service Asynchronous Transfer Mode data, said terrestrial spacecraft source terminal, and said spacecraft.

3. (Original) An arrangement according to claim 2, further comprising:

means at said terrestrial spacecraft source terminal for deleting at least some of said Resource Management cells from said Asynchronous Transfer Mode data which is transmitted over said uplink to said spacecraft; and

a terrestrial destination terminal coupled to said spacecraft by uplinks and downlinks, said terrestrial destination terminal including means for adding forward Resource Management cells to said Asynchronous Transfer Mode data cells, and for receiving returned resource management cells from downstream

locations, for thereby spoofing downstream locations which expect to receive Resource Management cells during Asynchronous Transfer Mode data operation.

4. (Original) An arrangement according to claim 2, wherein said coaction of said spacecraft and terrestrial Network Control Center to determine the level of congestion in said at least one service other than said Asynchronous Transfer Mode data Available Bit Rate service produces a signal explicitly representative of payload congestion.

5. (Original) An arrangement according to claim 2, wherein said Resource Management cells of said Available Bit Rate service Asynchronous Transfer Mode data are transmitted from said source terminal to a destination terminal by way of said spacecraft, and said destination terminal transmits said Available Bit Rate service Asynchronous Transfer Mode data which are received from said spacecraft to locations downstream of said destination terminal, and wherein back Resource Management cells arriving at said destination terminal are transmitted to said source terminal by way of said spacecraft, said arrangement further comprising;

congestion information marking means located at said source terminal, for receiving said back Resource Management cells, and for controllably marking said back Resource Management cells with information derived from said payload congestion information, so that Resource Management cells returning toward said

source of Available Bit Rate service Asynchronous Transfer Mode data include congestion data for controlling the cell rate of said Available Bit Rate service Asynchronous Transfer Mode data generated by said source of Available Bit Rate service Asynchronous Transfer Mode data for tending to control at least one of congestion at said spacecraft and at other locations of said transmission path.

6. (Original) A method for operating at least the spacecraft-related portion of a spacecraft data network for Available Bit Rate service Asynchronous Transfer Mode data, where routing switches of said spacecraft are not used for marking the data stream with congestion information, said method comprising the steps of:

at a source terminal, receiving said Available Bit Rate service Asynchronous Transfer Mode data, and transmitting said Available Bit Rate service Asynchronous Transfer Mode data, together with its Resource Management cells, to a destination terminal by way of said spacecraft, whereby said Resource Management cells of said Available Bit Rate service Asynchronous Transfer Mode data arriving at said destination terminal do not carry spacecraft congestion information relating specifically to said Available Bit Rate service Asynchronous Transfer Mode data;

determining spacecraft payload congestion attributable to a plurality of services, including services other than said Available Bit Rate service Asynchronous Transfer Mode data, to thereby generate payload congestion signals;

transmitting said payload congestion

signals to said source terminal; and
at said source terminal, controllably
marking said Resource Management cells of said
Available Bit Rate service Asynchronous Transfer
Mode data with information derived from said
payload congestion signals.